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Title: Functional and Operational Requirements for TA-18
Relocation to the NTS/DAF Site

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Functional and Operational Requirements for TA-18 Relocation to the NTS/DAF Site

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INTRODUCTION

Technical Area 18 (TA-18), or Pajarito Site, of the Los Alamos National Laboratory has been operational as a nuclear facility since 1945. The original complement of a dozen part-time researchers with a single mission in one building at the end of a dirt road has evolved to a complex, multimission facility with a staff of 125 occupying 25 major buildings adjacent to a heavily traveled road with public access. In the year 2000, the Secretary of Energy determined that the mission of TA-18 was essential to support national security, but that consideration had to be given to improving safety and physical security. It is presently proposed to relocate most of the TA-18 operations to the Device Assembly Facility (DAF) at the Nevada Test Site (NTS). The purpose of this paper is to identify the functional and operational requirements and to demonstrate how they can be met at the DAF.

TA-18 MISSION

The "Mission Review Group Report" and the "Technical Area 18 Missions and Capabilities" report identify the components of the TA-18 mission:

1. Conducting experiments below critical (subcritical), in the delayed critical region, and super-prompt critical (pulsed) region in support of national security programs, including the Stockpile Stewardship Program.
2. Supporting the nuclear emergency and accident response programs, and response to national and international terrorism, including homeland defense.
3. Developing safeguards and arms-control methods and technology in support of national and international

programs to detect and control nuclear materials.

4. Training professionals in support of all of the above activities.
5. Maintaining the capability to respond to some future criticality accident or nuclear materials handling or control situation that cannot be understood without special experiments.

In addition, the facility would be used to conduct experiments necessary to support re-emergent nuclear power or propulsion programs. TA-18 is the only remaining general-purpose critical facility in the United States.

FUNCTIONAL AND OPERATIONAL REQUIREMENTS

The relocated facility must provide:

1. Experimental bays and control rooms for four critical assembly machines, including a large capacity vertical lift machine (like the present Comet), a small capacity vertical lift machine (like the present Planet), a well-characterized benchmark machine (like the present Flattop), and a machine capable of super-prompt-critical operation (like the present Godiva IV).
2. An experimental bay and control room to accommodate active interrogation.
3. An experimental bay or bays to accommodate precise measurements, i.e., a low-room-return facility.
4. An experimental bay and associated control room for new experiments or the development and installation of new machines or assemblies.
5. Adequate secure storage facilities to accommodate the special nuclear

material (SNM) necessary to conduct experimental programs.

6. The ability to accommodate training classes for cleared and uncleared personnel and foreign nationals without interference with each other or experimental programs.
7. Adequate office space for the operating staff.
8. Conference rooms and training rooms to support mission requirements.
9. Provision for students to actively participate in training programs by hands-on operations and observations from within a control room.
10. The infrastructure to support the mission, including high-level security requirements, a machine shop, sanitary facilities, dormitories for permanent and visiting staff, and access to lunch and break rooms. The facilities must provide robust containment such that operational requirements are on the facility rather than restrictions placed on the assemblies.
11. The ability to evolve to meet unanticipated demands over a 40-year time horizon.

TA-18 OPERATIONS AT THE DEVICE ASSEMBLY FACILITY

Although the DAF was not designed to accommodate TA-18 activities, with some modifications to the interior, use of existing nearby structures, and new construction to accommodate office and experimental space, all of the missions requiring Category I and II quantities of SNM can be met. The existing mission of the DAF can also be maintained.

This can be accomplished by physically dividing the DAF to separate the existing DAF mission and TA-18 activities. TA-18 activities with the critical assembly machines and active interrogation accelerators, associated control rooms, and SNM storage facilities would be located in the existing structure. Two "Gravel Gerties" and a shielded bay would be modified for high-level operations. In some cases, this would require plastering the inside surfaces of the experimental areas with neutron-absorbing material to minimize room return. Modifications for control rooms, training rooms, SNM and material storage areas, health physics support, security facilities, and adequate sanitary facilities would complete the interior modifications.

Exterior modifications and construction would provide for a low-room-return experimental facility, a machine shop, staging areas, and a complete office support complex.

TRANSITION PLAN

Detailed planning for the transition of operations will minimize the downtime. Specifically, all of the critical assembly machines will be replaced, checked out at TA-18, moved to the DAF, and checked out "cold" so that "hot" operations can continue quickly when the SNM is moved. Similarly, it is anticipated that new accelerators will be installed in Nevada. Programmatic activity will continue in Los Alamos until the new facility has been authorized for use.

OPERATIONS AT NTS

How will the new facility be staffed? There are several responses to this question. The time scale for the move is several years. There is adequate time to acquire and train a new staff specifically for operations at NTS. In addition, the mode of operation will change to replace the present scientist-machine-operators with operators dedicated to the machines rather than the experiment. This would allow monitoring, measurement, and observation by two-way television. Remote observation is accepted at TA-18 where the experimental bays are 1/4 mile from the control rooms now. Los Alamos, Sandia, and Livermore have successfully maintained experimental operations at NTS for nearly 50 years.

REFERENCES

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